Converting the Religious: Putting Amphibian Conservation in Context

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In August 2007, at a remote site in the Darien Province of Panama, I surveyed amphibians for immune defenses against *Batrachochytrium dendrobatidis,* the lethal chytrid fungus linked to many population extinctions throughout Central America. While lodging at a Catholic mission bordering our site, I met Padre Wally, an American expatriate and priest who has been working to bring education, clean water, and roads to the people of the region. To preserve the watershed, he maintains Parque Natural San Francisco, one of several large areas of rainforest. Ironically, the padre knew little about the park's biodiversity, but much about construction. Bulldozers and heavy equipment lay between our lodge and the park. Thus began an effort to put amphibian conservation in context, and to understand the role of a conservation biologist in communicating the value of biodiversity to nonscientists. In the face of urgent human need, can we motivate expensive conservation action with utilitarian scientific justifications?

By definition, conservation biology is a discipline with two goals: one scientific, to obtain knowledge of the natural world, and the other ethical, to preserve or restore biodiversity (see the Society for Conservation Biology Web site, *www.conbio.org/AboutUs*). To inspire conservation, biologists often communicate ecological concepts through commonly understood metaphors or frameworks. For example, ecosystem health has been quantitatively developed as a framework analogous to human health, and applied to understanding the healthy functioning of watersheds and parasite diversity (Hudson et al. 2006). Another framework includes focal species concepts, such as flagship, indicator, and keystone species that can summarize multifaceted ecosystems and facilitate conservation. Such metaphors can be very influential.

However, these frameworks fall short of contextualizing biodiversity conservation for all people, particularly those with values based on faith, not science. According to the *2006 Britannica Book of the Year,* 88.1 percent of the world's 6.5 billion people are religious adherents, the largest segment of whom are Christian (33.1 percent in the world, 83.3 percent in the United States). Sectors of the faith community have historically held environmentally destructive views: for instance, that God created nature for unlimited human domination, and that nature is passing away and thus lacks any deep value. These views are increasingly described as doctrinal misinterpretations (Schaeffer and Middelmann 1970). In fact, many of the world's religions contain environmental ethics, sometimes hidden within doctrine, but powerful when expressed. In J. Baird Callicott's view, "Purely secular programs—bureaucratic, technological, legal, or educational—aimed at achieving environmental conservation may remain ineffective unless the environmental ethics latent in traditional worldviews animate and reinforce them" (Callicott 1994).

Scientists may help convince the religious community of the mandate for biodiversity conservation by pointing the faithful toward their own environmental ethics. Indeed, if scientists appeal to people of faith, our critical information might gain more concerted attention. The weight of the faith community could tip the scales of cost-benefit analyses in favor of research and conservation.

To be clear, I am not suggesting that creationism, intelligent design, or other faith-based theories be supported by scientists. I am suggesting that science, at its interface with the public, be presented in accessible and socially relevant terms. Science exists in a value-laden political and social context, and framing our results does not reduce the purity or rigor of the scientific method. Rather, the frame is merely a decoration to draw attention to the picture.

Framing science applies to any audience; here I focus on the faith community because it is large and many in it are suspicious of scientific claims. By emphasizing the moral excellence, the virtue, of biodiversity-conservation recognized by scientists and religious adherents alike, scientists may gain a foot in the door and begin to speak through the crack. We might influence a large audience that was previously indoctrinated against conservation.

Environmental stewardship is a common framework found in the sacred texts of religions worldwide (Callicott 1994), and although not popularly expounded in public worship services, the Judeo-Christian tradition is rich with examples. The task given to Adam (humankind) of naming all the animals in the garden is the first biblical endorsement of biology, and that effort is far from complete. This scientific endeavor establishes both a respect for the existence and well-being of other organisms and a distinctive human responsibility. Concerning these organisms, Noah was commanded to "keep their various kinds alive throughout the earth" (Genesis 7:3, New International Version; *www.ibsstl.org/bibles/tniv/index.php*). Psalm 104 indicates that some aspects of biodiversity are valuable when humans are absent, including natural places intended to sustain cedars, storks, wild goats, and rock badgers. In addition to particular scriptures on stewardship, environmental considerations are at the heart of overarching principles of faith, such as covenant, fruitfulness, contentment, incarnation, and Sabbath. When

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conservation is set within the context of these principles, a person of faith may respond with deep commitment.

Gould (1997) suggests: "Here, I believe, lies the greatest strength and necessity of NOMA, the nonoverlapping magisteria of science and religion. NOMA permits—indeed enjoins—the prospect of respectful discourse, of constant input from both magisteria toward the common goal of wisdom." Rather than disregard faith-based values, the science community would be wise to embrace an integrated discussion and contribute to healing an epistemological rift. When faith is perceived to be in accord with a value of science such as the virtue of conservation, scientists can secure a bridge with a faith-full public.

Case study: Amphibian conservation

The scale of amphibian population declines is global: up to one-third of the 6000 recognized amphibian species are threatened, and at least 122 have possibly become extinct since 1980 (Gascon et al. 2007). A consensus among amphibian biologists concerning the appropriate and moral response is now emerging. What values do these scientists use in suggesting a response? Public and political endorsement, including funding for the $400 million Amphibian Conservation Action Plan, may largely depend on that answer.

The Amphibian Conservation Action Plan (Gascon et al. 2007) only briefly mentions the public benefit of and reasons for conserving amphibians. According to the plan, the chief value of amphibians is in their potential use for medicines and biomedical models; another benefit derives from their importance in the ecosystem, sometimes as dominant vertebrates. Their most widely acknowledged value, however, may be aesthetic—the beauty and popularity of the iconic red-eyed tree frog (*Agalychnis callidryas*) is undeniable. The ecotourism industry, the pet trade, and zoos prize this value. Although the utilitarian values are significant, it is uncertain whether they can motivate expensive conservation action on a large scale.

Most amphibian biologists regard species as intrinsically valuable in their natural state. Aldo Leopold's land ethic (see *www.luminary.us/leopold/land_ethic.html*), ecologically updated, guides their conservation studies. Nevertheless, rather than risk seeming to be nonobjective, biologists have undervalued amphibians, reducing their worth to their utility as sentinels of an environmental crisis of which the public is already well aware. Rolston (1988) suggests, "Like music and the fine arts, natural science is an intrinsically worthwhile activity, but scientists find this difficult to say and, sometimes with much ingenuity, sell their study short by retreating to some utilitarian subterfuge." The virtue of biodiversity conservation is essential to the acquisition of knowledge and its application. Emphasizing this ethical aspect of science may improve its public and political palatability.

The effort to convert the religious has already begun. For example, the Society for Conservation Biology has initiated a working group to discuss common ground and build cooperation between religion and science. The American Association for the Advancement of Science recently held a symposium titled "Communicating Science in a Religious America" to develop fluency and deeper familiarity with the nonscientific perspectives of environmental ethics. Perhaps soon, organizations such as Amphibian Ark (*www.amphibianark.org*) and Save the Frogs will have online links not only to "Musicians for Frogs" (*www.savethefrogs.com/musicians/index.html*) and "Teachers for Frogs" (*www.savethefrogs.com/teachers/index.html*) but also to "Southern Baptists for Frogs" and "Evangelicals for Frogs." The time is approaching when the "broader significance" sections of federal grant proposals may read: "Amphibians are important not only for utilitarian and human-centered benefits but also for innate and theocentric values that integrate biological understanding with conviction in the moral virtue of biodiversity conservation."

Amphibian conservation biologists follow pure scientific method, but they may be acting from an as yet unspoken moral imperative. It would be a shame to discourage public involvement or the next generation of amphibian biologists, for example, by asserting that science and religion have no common sources of virtue.

When next I talk with Padre Wally, I'll talk about amphibian conservation in the context of stewardship. I'll emphasize our shared human responsibility to the world we've received, whether as a Catholic priest or as an ecologist. What at first appears to be a contradiction in ideologies is in fact a collaboration. Brought together by environmental crisis, science and faith are converging on the virtue of biodiversity conservation. Emphasizing virtue in science is not corruptive because it happens to correspond with faith-based movements, and it is integral and necessary to building public support and motivating effective conservation.

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